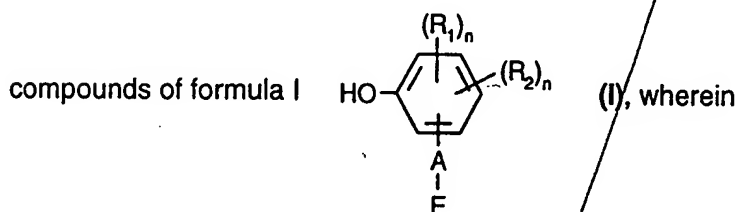


What is claimed is

1. A process for stabilising and at the same time phase compatibilising plastics or plastic compositions by incorporating polymeric compounds obtainable by reacting a compound selected from the group consisting of the sterically hindered phenols, sterically hindered amines, lactones, sulfides, phosphites, benzotriazoles, benzophenones and 2-(2-hydroxy-phenyl)-1,3,5-triazines, which compounds contain at least one reactive group, with a compatibilisator.

2. A process according to claim 1, wherein the sterically hindered phenols are



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$R_1$  and  $R_2$  are each independently of the other hydrogen,  $C_1$ - $C_{25}$ alkyl, phenyl- $C_1$ - $C_3$ alkyl which is unsubstituted or substituted once or several times at the aromatic ring by OH or/and  $C_1$ - $C_4$ alkyl, unsubstituted or  $C_1$ - $C_4$ alkyl-substituted  $C_5$ - $C_{12}$ cycloalkyl, or phenyl;  
 $n$  is 1, 2 or 3;

$E$  is OH, SH,  $NHR_3$ ,  $SO_3H$ ,  $COOH$ ,  $-CH=CH_2$ ,  $-(CH_2)_m-CH-CH_2$  or  $-P(=O)(OH)-R_4$  ;

$m$  is 0 or 1;

$R_3$  is hydrogen or  $C_1$ - $C_9$ alkyl;

$R_4$  is  $C_1$ - $C_{12}$ alkyl, or phenyl which is unsubstituted or substituted by one or several  $C_1$ - $C_4$ -alkyl, halogen or/and  $C_1$ - $C_{18}$ alkoxy;

$A$  if  $E$  is OH, SH or  $-CH=CH_2$ , is  $-C_xH_{2x}-$ ,  $-CH_2-S-CH_2CH_2-$ ,  $-C_qH_{2q}-(CO)-O-C_pH_{2p}-$ ,  $-C_qH_{2q}-(CO)-NH-C_pH_{2p}-$  or  $-C_qH_{2q}-(CO)-O-C_pH_{2p}-S-C_qH_{2q}-$  ;


$x$  is a number from 0 to 8;

$p$  is a number from 2 to 8;

$q$  is a number from 0 to 3;

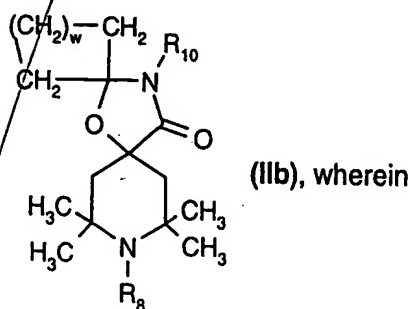
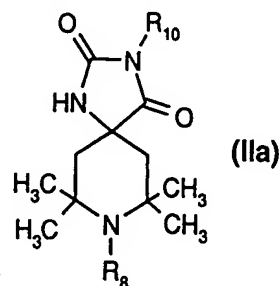
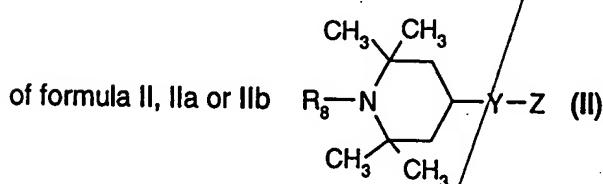
$R_1$  and  $n$  are as defined above; or



- A if E is  $\text{-NHR}_3$ , is  $\text{-C}_x\text{H}_{2x}\text{-}$  or  $\text{-C}_q\text{H}_{2q}\text{-(CO)-NH-C}_p\text{H}_{2p}\text{-}$ , wherein x, p and q have the meanings cited above; or
- A if E is  $\text{COOH}$  or  $\text{SO}_3\text{H}$ , is  $\text{-C}_x\text{H}_{2x}\text{-}$ ,  $\text{-CH}_2\text{-S-CH}_2\text{-}$  or  $\text{-CH}_2\text{-S-CH}_2\text{CH}_2\text{-}$ , wherein x has the meaning cited above; or

- A if E is  $\text{-(CH}_2\text{)}_m\text{-CH-CH}_2\text{-}$  , is a direct bond,  $\text{-C}_q\text{H}_{2q}\text{-(CO)}_m\text{-O-CH}_2\text{-}$  or  $\text{-C}_x\text{H}_{2x}\text{-S-CH}_2\text{-}$ , wherein q, m, x,  $\text{R}_1$  and  $\text{R}_2$  are as defined above;

- A if E is  $\text{-P(=O)(OH)-R}_4$ , is  $\text{-CH}_2\text{-}$ .

3. A process according to claim 1, wherein the sterically hindered amines are compounds



- $\text{R}_8$  is hydrogen,  $\text{C}_1\text{-C}_{25}$ alkyl,  $\text{C}_2\text{-C}_{20}$ alkenyl,  $\text{C}_2\text{-C}_{20}$ alkynyl,  $\text{C}_1\text{-C}_{20}$ alkoxy, phenyl- $\text{C}_1\text{-C}_3$ alkyl,  $\text{C}_5\text{-C}_{12}$ cycloalkyl,  $\text{C}_5\text{-C}_8$ cycloalkoxy, phenyl, naphthyl, hydroxyethyl,  $\text{CO-C}_1\text{-C}_{25}$ alkyl,  $\text{CO-phenyl}$ ,  $\text{CO-naphthyl}$ ,  $\text{CO-phenyl-C}_1\text{-C}_3$ alkyl,  $\text{O-CO-C}_1\text{-C}_{20}$ alkyl or  $\text{C}_1\text{-C}_6$ alkyl-S- $\text{C}_1\text{-C}_6$ alkyl,  $\text{C}_1\text{-C}_6$ alkyl-O- $\text{C}_1\text{-C}_6$ alkyl,  $\text{C}_1\text{-C}_6$ alkyl-(CO)- $\text{C}_1\text{-C}_6$ alkyl,  $\text{-CH}_2\text{CH}_2\text{-O-CH}_2\text{-CH-CH}_2\text{-}$   or  $\text{-CH}_2\text{-CH-CH}_2\text{-}$  

W is a number from 1 to 10;

Y is a single bond, C<sub>1</sub>-C<sub>25</sub>alkylene, phenylene, biphenylene, naphthylene,

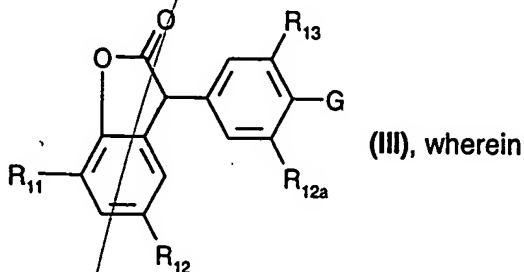
-O-C<sub>1</sub>-C<sub>25</sub>alkylene, -NR<sub>9</sub>-, -O- or  $\begin{array}{c} R_9-C=O \\ | \\ -N-C-C_{25}\text{alkylene} \end{array}$  ;

Z is hydrogen, -COOR<sub>9</sub>, -NH<sub>2</sub>, -OR<sub>9</sub>, hydroxyethyl,  $-CH_2-\overset{\text{O}}{\text{CH}}-CH_2$  or  $-\overset{\text{O}}{\underset{\text{R}_9}{\text{C}}}-\overset{\text{O}}{\text{C}}=CH_2$  ;

R<sub>9</sub> is hydrogen or C<sub>1</sub>-C<sub>12</sub>alkyl;

R<sub>10</sub> has the same definition as R<sub>9</sub>.

4. A process according to claim 1, wherein the lactones are compounds of formula III



R<sub>11</sub>, R<sub>12</sub>, R<sub>12a</sub> and R<sub>13</sub> are each independently of one another hydrogen, C<sub>1</sub>-C<sub>25</sub>alkyl, phenyl-C<sub>1</sub>-C<sub>3</sub>alkyl, C<sub>5</sub>-C<sub>12</sub>cycloalkyl or phenyl; and

G is OH, OCH<sub>2</sub>CH<sub>2</sub>OH,  $-O-CH_2-\overset{\text{O}}{\text{CH}}-CH_2$  or -OCH<sub>2</sub>COOH.

5. A process according to claim 1, wherein the sulfides are compounds of formula IV



R<sub>15</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl, benzyl, phenyl or  $-\overset{\text{S}}{\underset{\text{||}}{\text{P}}}-(OR_{17})_2$  ; and

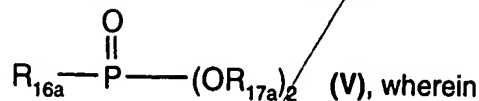
R<sub>16</sub> is -CH<sub>2</sub>CH<sub>2</sub>OH,  $-CH_2-\overset{\text{O}}{\text{CH}}-CH_2$ , -CH<sub>2</sub>COOH or -CH<sub>2</sub>CH<sub>2</sub>COOH; and

R<sub>17</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl or unsubstituted or C<sub>1</sub>-C<sub>4</sub>alkyl-substituted phenyl.

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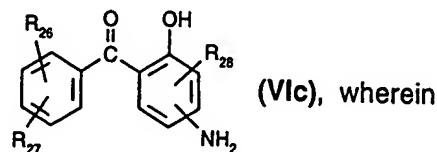
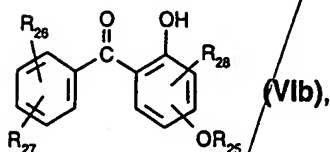
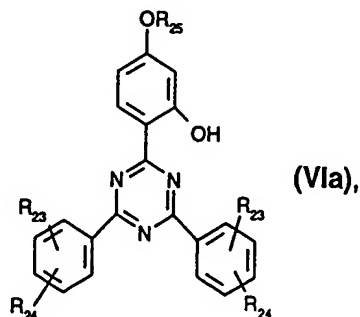
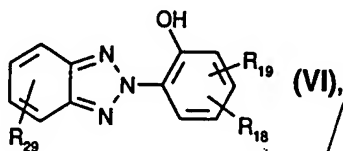
6. A process according to claim 1, wherein the phosphites are compounds of formula V



$R_{16a}$  is  $-\text{CH}_2\text{CH}_2\text{OH}$  or  $-\text{CH}_2\text{CH}_2\text{COOH}$ ; and

$R_{17a}$  is  $\text{C}_1\text{-C}_{18}$ alkyl or unsubstituted or  $\text{C}_1\text{-C}_4$ alkyl-substituted phenyl.

7. A process according to claim 1, wherein the benzotriazoles, benzophenones and 2,4,6-triaryl-1,3,5-triazines are compounds of formula VI, VIa, VIb or VIc



$R_{18}$  is  $-(\text{CH}_2)_r\text{-R}_{20}$ ,  $-\text{O}-\text{CH}_2-\overset{\overset{O}{\parallel}}{\text{C}}-\text{CH}_2$  or  $\text{NH}_2$ ;

$R_{19}$  is  $\text{C}_1\text{-C}_{12}$ alkyl,  $\alpha,\alpha$ -dimethylbenzyl or a radical  $-\text{CH}_2-\text{C}(\text{CH}_3)_2-\text{CH}_2-\text{C}(\text{CH}_3)_3$  ;

$R_{20}$  is  $-\text{OH}$ ,  $-\text{SH}$ ,  $-\text{NHR}_{30}$ ,  $-\text{SO}_3\text{H}$ ,  $-\text{COOR}_{21}$ ,  $-\text{CH}=\text{CH}_2$ ,  $-(\text{CH}_2)_m-\overset{\overset{O}{\parallel}}{\text{C}}-\text{CH}_2$  or  $-(\text{CO})-\text{NH}-(\text{CH}_2)_u-\text{NCO}$ ;

$R_{21}$  is hydrogen,  $-\text{CH}_2-\overset{\overset{O}{\parallel}}{\text{C}}-\text{CH}_2$  or  $-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_2-\text{O}-(\text{CO})-\text{R}_{22}$ ;

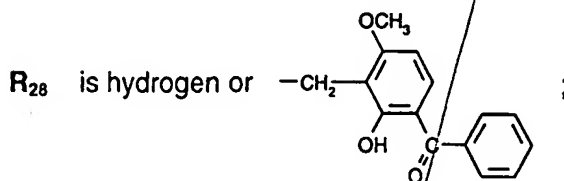
$R_{22}$  is  $\text{C}_1\text{-C}_4$ alkyl or phenyl;

$R_{23}$  and  $R_{24}$  are each independently of the other hydrogen or  $\text{C}_1\text{-C}_4$ alkyl;

$R_{25}$  is hydrogen,  $-(\text{CH}_2)_v\text{-OH}$ ,  $-\text{CH}_2-\overset{\overset{O}{\parallel}}{\text{C}}-\text{CH}_2$ ,  $-(\text{CH}_2)_v\text{COOH}$  or  $-(\text{CO})-\text{NH}-(\text{CH}_2)_u-\text{NCO}$ ;

R<sub>26</sub> is hydrogen, OH or C<sub>1</sub>-C<sub>12</sub>alkoxy;

R<sub>27</sub> is hydrogen or OH;



R<sub>29</sub> is hydrogen or halogen;

R<sub>30</sub> is hydrogen or C<sub>1</sub>-C<sub>9</sub>alkyl;

m is 0 or 1;

t is a number from 0 to 6;

u is a number from 2 to 12.

8. A process according to claim 1, wherein the compatibiliser compound is a polymer containing acid groups, acid anhydride groups, ester groups, epoxy groups or alcohol groups or wherein the compatibiliser compound is a copolymer or terpolymer of polyethylene, polypropylene, vinyl acetate or styrene with acrylic acid.

9. A process according to claim 8, wherein the compatibiliser compound is a polymer with acrylic acid (AA) function, glycidyl methacrylate (GMA) function, methacrylic acid (MAA) function, maleic anhydride (MAH) function or vinyl alcohol (VA) function.

10. A process according to claim 8, wherein the compatibiliser compound is a copolymer consisting of polyethylene acrylic acid (PE-AA), polyethylene glycidyl methacrylate (PE-GMA), polyethylene methacrylic acid (PE-MAA) or polyethylene maleic anhydride (PE-MAH) or a terpolymer of polyethylene and vinyl acetate with acrylic acid or a terpolymer of polyethylene and acrylates with acrylic acid.

11. A process according to claim 8, wherein the compatibiliser compound is a grafted polyethylene or polypropylene copolymer selected from the group consisting of maleic anhydride grafted to polyethylene vinyl acetate (MAH-g-PE-vinyl acetate), maleic anhydride grafted to low density polyethylene (MAH-g-LDPE), maleic anhydride grafted to high density

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polyethylene (MAH-g-HDPE), maleic anhydride grafted to linear low density polyethylene (MAH-g-LLDPE), acrylic acid grafted to polypropylene (AA-g-PP), glycidyl methacrylate grafted to polypropylene (GMA-g-PP), maleic anhydride grafted to polypropylene (MAH-g-PP), maleic anhydride grafted to ethylene/propylene terpolymer (MAH-g-EPDM), maleic anhydride grafted to ethylene/propylene rubber (MAH-g-EPM) and maleic anhydride grafted to polyethylene/polypropylene copolymer (MAH-g-PE/PP).

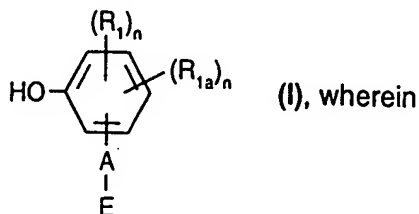
12. A process according to claim 8, wherein the compatibiliser compound is a grafted styrene co- or terpolymer selected from the group consisting of styrene/acrylonitrile grafted with maleic anhydride (SAN-g-MAH), styrene/maleic anhydride/methyl methacrylate, styrene/butadiene/styrene block copolymer grafted with maleic anhydride (SBS-g-MAH), styrene/ethylene/propylene/styrene block copolymer grafted with maleic anhydride (SEPS-g-MAH), styrene/ethylene/butadiene/styrene block copolymer grafted with maleic anhydride (SEPS-g-MAH) and acrylic acid/polyethylene/polystyrene terpolymer (AA-PE-PS-terpolymer).

13. A process according to claim 8, wherein the compatibiliser compound is a vinyl alcohol copolymer.

14. A process according to claim 1, wherein the polymers to be stabilised are at least two different polymers.

15. A process according to claim 1, wherein the polymers to be stabilised are recycled material.

16. A compound obtainable by reacting sterically hindered phenols of formula I



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$R_1$  and  $R_2$  are each independently of the other hydrogen,  $C_1$ - $C_{25}$ alkyl, phenyl- $C_1$ - $C_3$ alkyl which is unsubstituted or substituted once or several times at the aromatic ring by OH or/and  $C_1$ - $C_4$ alkyl, unsubstituted or  $C_1$ - $C_4$ alkyl-substituted  $C_5$ - $C_{12}$ cycloalkyl, or phenyl;  
 $n$  is 1, 2 or 3;

$E$  is OH, SH,  $NHR_3$ ,  $SO_3H$ ,  $COOH$ ,  $-CH=CH_2$ ,  $-(CH_2)_m-\overset{\text{O}}{\text{CH}}-\text{CH}_2$  or  $-\overset{\text{O}}{\underset{\text{OH}}{\text{P}}}-R_4$  ;

$m$  is 0 or 1;

$R_3$  is hydrogen or  $C_1$ - $C_9$ alkyl;

$R_4$  is  $C_1$ - $C_{12}$ alkyl, phenyl which is unsubstituted or substituted by one or several  $C_1$ - $C_4$ -alkyl, halogen or/and  $C_1$ - $C_{18}$ alkoxy;

$A$  if  $E$  is OH, SH or  $-CH=CH_2$ , is  $-C_xH_{2x}-$ ,  $-CH_2-S-CH_2CH_2-$ ,  $-C_qH_{2q}-(CO)-O-C_pH_{2p}-$ ,  $-C_qH_{2q}-(CO)-NH-C_pH_{2p}-$  or  $-C_qH_{2q}-(CO)-O-C_pH_{2p}-S-C_qH_{2q}-$  ;

$x$  is a number from 0 to 8;

$p$  is a number from 2 to 8;

$q$  is a number from 0 to 3;

$R_1$  and  $n$  are as defined above; or

$A$  if  $E$  is  $-NHR_3$ , is  $-C_xH_{2x}-$  or  $-C_qH_{2q}-(CO)-NH-C_pH_{2p}-$ , wherein  $x$ ,  $p$  and  $q$  have the meanings cited above; or

$A$  if  $E$  is  $COOH$  or  $SO_3H$ , is  $-C_xH_{2x}-$ ,  $-CH_2-S-CH_2-$  or  $-CH_2-S-CH_2CH_2-$ , wherein  $x$  has the meaning cited above; or

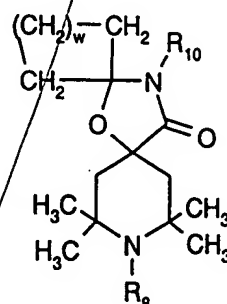
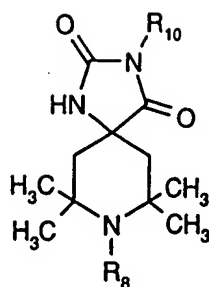
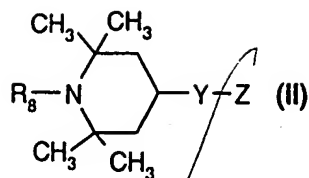
$A$  if  $E$  is  $-(CH_2)_m-\overset{\text{O}}{\text{CH}}-\text{CH}_2$ , is a direct bond,  $-C_qH_{2q}-(CO)-O-CH_2-$  or  $-C_xH_{2x}-S-CH_2-$ , wherein  $q$ ,  $m$ ,  $x$ ,  $R_1$  and  $R_2$  are as defined above;

$A$  if  $E$  is  $-\overset{\text{O}}{\underset{\text{OH}}{\text{P}}}-R_4$ , is  $-CH_2-$  ;

or sterically hindered amines of formula II, IIa or IIb

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$R_8$  is hydrogen,  $C_1$ - $C_{25}$ alkyl,  $C_2$ - $C_{20}$ alkenyl,  $C_2$ - $C_{20}$ alkynyl,  $C_1$ - $C_{20}$ alkoxy, phenyl- $C_1$ - $C_3$ alkyl,  $C_5$ - $C_{12}$ cycloalkyl,  $C_5$ - $C_8$ cycloalkoxy, phenyl, naphthyl, hydroxyethyl, CO- $C_1$ - $C_{25}$ alkyl, CO-phenyl, CO-naphthyl, CO-phenyl- $C_1$ - $C_3$ alkyl, O-CO- $C_1$ - $C_{20}$ alkyl or  $C_1$ - $C_6$ alkyl-S- $C_1$ - $C_6$ alkyl,  $C_1$ - $C_6$ alkyl-O- $C_1$ - $C_6$ alkyl,

$C_1$ - $C_6$ alkyl-(CO)- $C_1$ - $C_6$ alkyl,  $-CH_2CH_2-O-CH_2-\overset{\text{O}}{\underset{\text{O}}{\text{CH}}}-CH_2$  or  $-CH_2-\overset{\text{O}}{\underset{\text{O}}{\text{CH}}}-CH_2$ ;

$w$  is a number from 1 to 10;

$Y$  is a single bond,  $C_1$ - $C_{25}$ alkylene, phenylene, biphenylene, naphthylene,

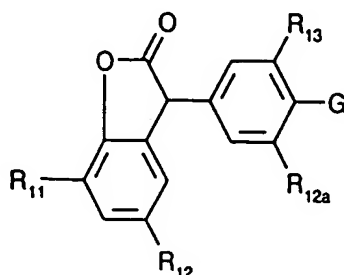
$-O-C_1-C_{25}$ alkylene,  $-NR_9-$ ,  $-O-$  or  $\begin{array}{c} R_9-C=O \\ | \\ -N-C_1-C_{25} \end{array}$ alkylene ;

$Z$  is hydrogen,  $-COOR_9$ ,  $-NH_2$ ,  $-OR_9$ , hydroxyethyl,  $-CH_2-\overset{\text{O}}{\underset{\text{O}}{\text{CH}}}-CH_2$  or  $-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-CH_2$  ;

$R_9$  is hydrogen or  $C_1$ - $C_{12}$ alkyl;

$R_{10}$  has the same definition as  $R_8$ ;

or lactones of formula III



$R_{11}$ ,  $R_{12}$ ,  $R_{12a}$  and  $R_{13}$  are each independently of one another hydrogen,  $C_1$ - $C_{25}$ alkyl,



phenyl-C<sub>1</sub>-C<sub>3</sub>alkyl, C<sub>5</sub>-C<sub>12</sub>cycloalkyl or phenyl; and

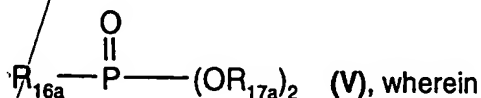
G is OH, OCH<sub>2</sub>CH<sub>2</sub>OH,  $-\text{CH}_2-\text{CH}(\text{O})-\text{CH}_2-$  or -OCH<sub>2</sub>COOH;  
or sulfides of formula IV



R<sub>15</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl, benzyl, phenyl or  $-\text{P}(=\text{S})(\text{OR}_{17})_2$ ; and

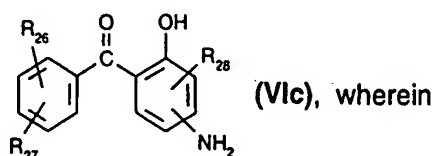
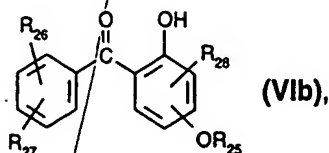
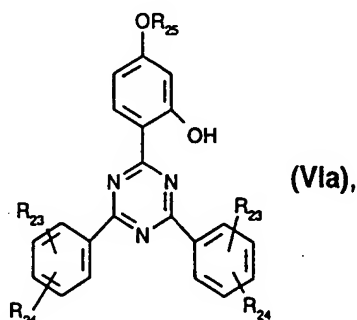
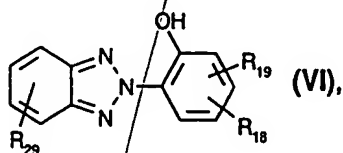
R<sub>16</sub> is -CH<sub>2</sub>CH<sub>2</sub>OH,  $-\text{CH}_2-\text{CH}(\text{O})-\text{CH}_2-$ , -CH<sub>2</sub>COOH or -CH<sub>2</sub>CH<sub>2</sub>COOH; and

R<sub>17</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl or unsubstituted or C<sub>1</sub>-C<sub>4</sub>alkyl-substituted phenyl;  
or phosphites of formula V



R<sub>16a</sub> is -CH<sub>2</sub>CH<sub>2</sub>OH or -CH<sub>2</sub>CH<sub>2</sub>COOH; and

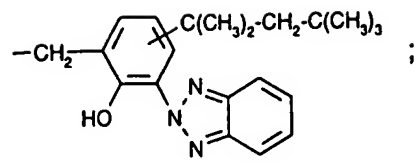
R<sub>17a</sub> is C<sub>1</sub>-C<sub>18</sub>alkyl or unsubstituted or C<sub>1</sub>-C<sub>4</sub>alkyl-substituted phenyl;  
or benzotriazoles, benzophenones or 2,4,6-triaryl-1,3,5-triazines of formula VI, VIa, VIb or VIc

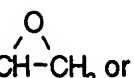


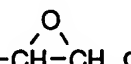
R<sub>18</sub> is -(CH<sub>2</sub>)<sub>1</sub>-R<sub>20</sub>,  $-\text{O}-\text{CH}_2-\text{CH}(\text{O})-\text{CH}_2-$  or NH<sub>2</sub>;

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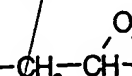
**R<sub>19</sub>** is C<sub>1</sub>-C<sub>12</sub>alkyl, α,α-dimethylbenzyl or a radical  ;

**R<sub>20</sub>** is -OH, -SH, -NHR<sub>30</sub>, -SO<sub>3</sub>H, -COOR<sub>21</sub>, -CH=CH<sub>2</sub>,  or  
-(CO)-NH-(CH<sub>2</sub>)<sub>u</sub>-NCO;

**R<sub>21</sub>** is hydrogen,  or -CH<sub>2</sub>-CH(OH)-CH<sub>2</sub>-O-(CO)-R<sub>22</sub>;

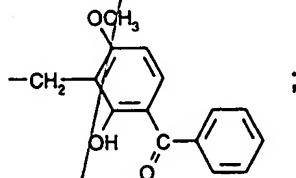
**R<sub>22</sub>** is C<sub>1</sub>-C<sub>4</sub>alkyl or phenyl;

**R<sub>23</sub>** and **R<sub>24</sub>** are each independently of the other hydrogen or C<sub>1</sub>-C<sub>4</sub>alkyl;

**R<sub>25</sub>** is hydrogen, -(CH<sub>2</sub>)<sub>u</sub>-OH, , -(CH<sub>2</sub>)<sub>u</sub>COOH or -(CO)-NH-(CH<sub>2</sub>)<sub>u</sub>-NCO;

**R<sub>26</sub>** is hydrogen, OH or C<sub>1</sub>-C<sub>12</sub>alkoxy;

**R<sub>27</sub>** is hydrogen or OH;

**R<sub>28</sub>** is hydrogen or  ;

**R<sub>29</sub>** is hydrogen or halogen;

**R<sub>30</sub>** is hydrogen or C<sub>1</sub>-C<sub>6</sub>alkyl;

**m** is 0 or 1;

**t** is a number from 0 to 6;

**u** is a number from 2 to 12;

with a compatibiliser compound.

17. Use of compounds according to claim 16 as stabilisers and at the same time as phase compatibilisers in plastics or plastic compositions.

10994-452E001

SUB  
B2